

**Abstract of the Disclosure**

Embodiments of the invention include a method and apparatus for making optical fiber preforms and optical fiber. The method includes the steps of positioning an overclad tube around a preform core rod, heating the overclad tube along the length thereof in the presence of a pressure gradient to collapse onto the preform core to form the overclad optical fiber preform, and adjusting the radial size of a heated portion of the preform core rod and/or the overclad tube to actively match the radial dimensions of the preform core rod along the length thereof with corresponding portions of the overclad tube. The active matching reduces variations in the physical dimensions of the preform core rod and/or the overclad tube, which improves transmission and other performance characteristics of fiber drawn from the created preform, e.g., by maintaining a relatively constant  $D/d$  ratio of the preform.